Storm Water Management Workshop

City of Helotes

December 3, 2005

LNV ENGINEERING
engineers & consultants

Introductions

- Jim Clements, P.E., C.F.M. – LNV Engineering
  - Byron Sanderfer, E.I.T. – LNV Engineering
- Steve Graham, P.E., C.F.M., - Director of Watershed Management, San Antonio River Authority
- Steve Gonzales, P.E., C.F.M., - Watershed Engineer, San Antonio River Authority; Region 6 Director – Texas Floodplain Management Association

LNV ENGINEERING
engineers & consultants

Introductions

- Karim Jacaman, E.I.T., C.F.M. – Flood Control Analyst, Bexar County Infrastructure Services Department
- Joe duMenil, C.F.M. – LNV Engineering

LNV ENGINEERING
engineers & consultants

Workshop Purpose

- Overview of the Bexar Regional Watershed Management program
- Floodplain management – community responsibilities
- Identification of storm water issues in the City of Helotes – regional versus local drainage
- Next steps

LNV ENGINEERING
engineers & consultants

Watershed Management

- Principles
  - The urban environment and each watershed within it form a single, interacting system. Actions have consequences.
  - Floodplain and storm water management is a matter of time and space allocation. Water requires space and must be stored and conveyed, in either appropriate or inappropriate places.

Watershed Management

- Principles (cont.)
  - Floodplains and storm water are resources. If they can become recreation or beautification assets, so much the better.
  - Floodplain and storm water management programs should include multiple purposes and multiple means.
  - Changes in the natural balance requires compensations. Nature bats last.

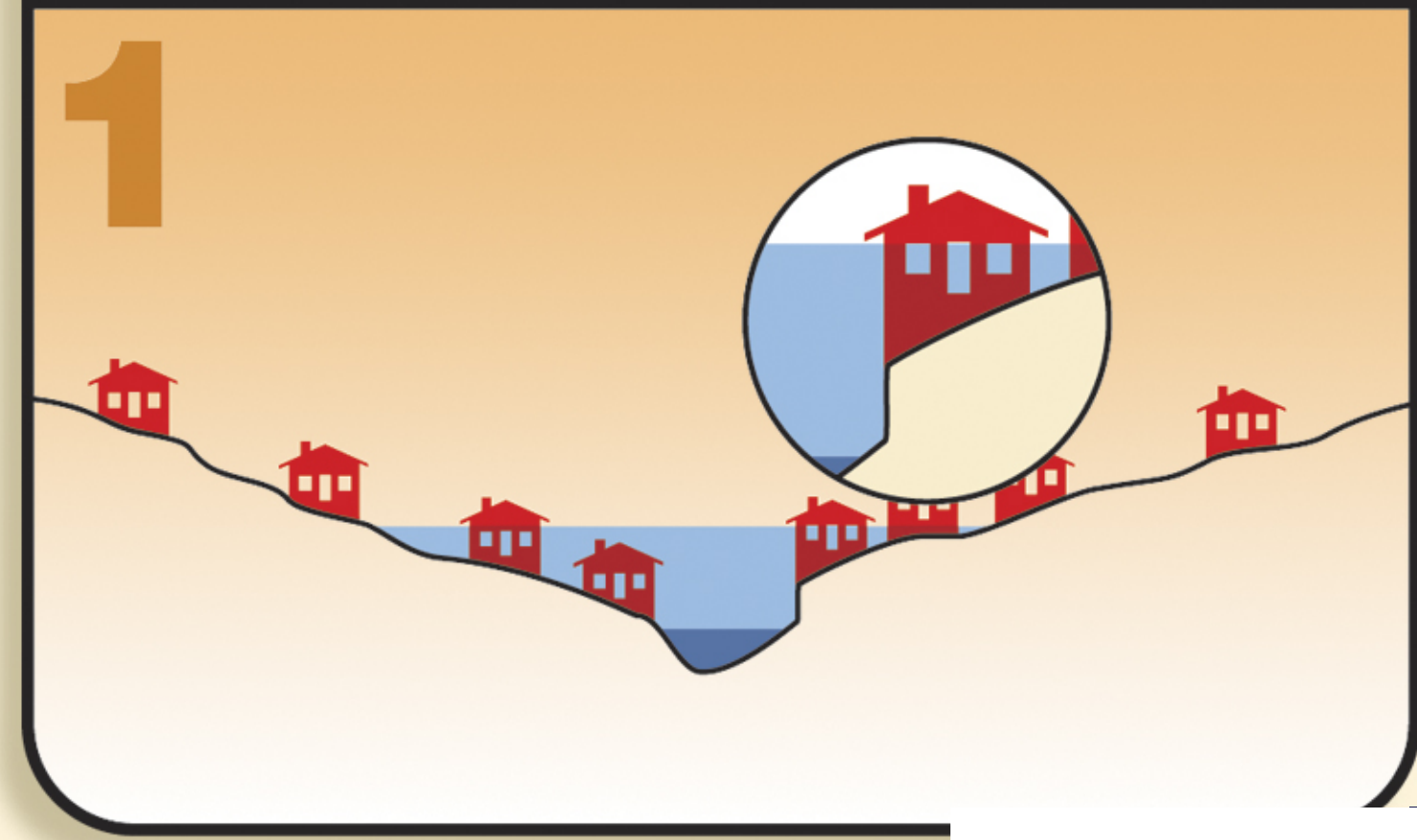
Watershed Management

Floodplains are natural storage and conveyance facilities, and all storm water management efforts should be directed toward helping them serve that function.

Understanding Flooding

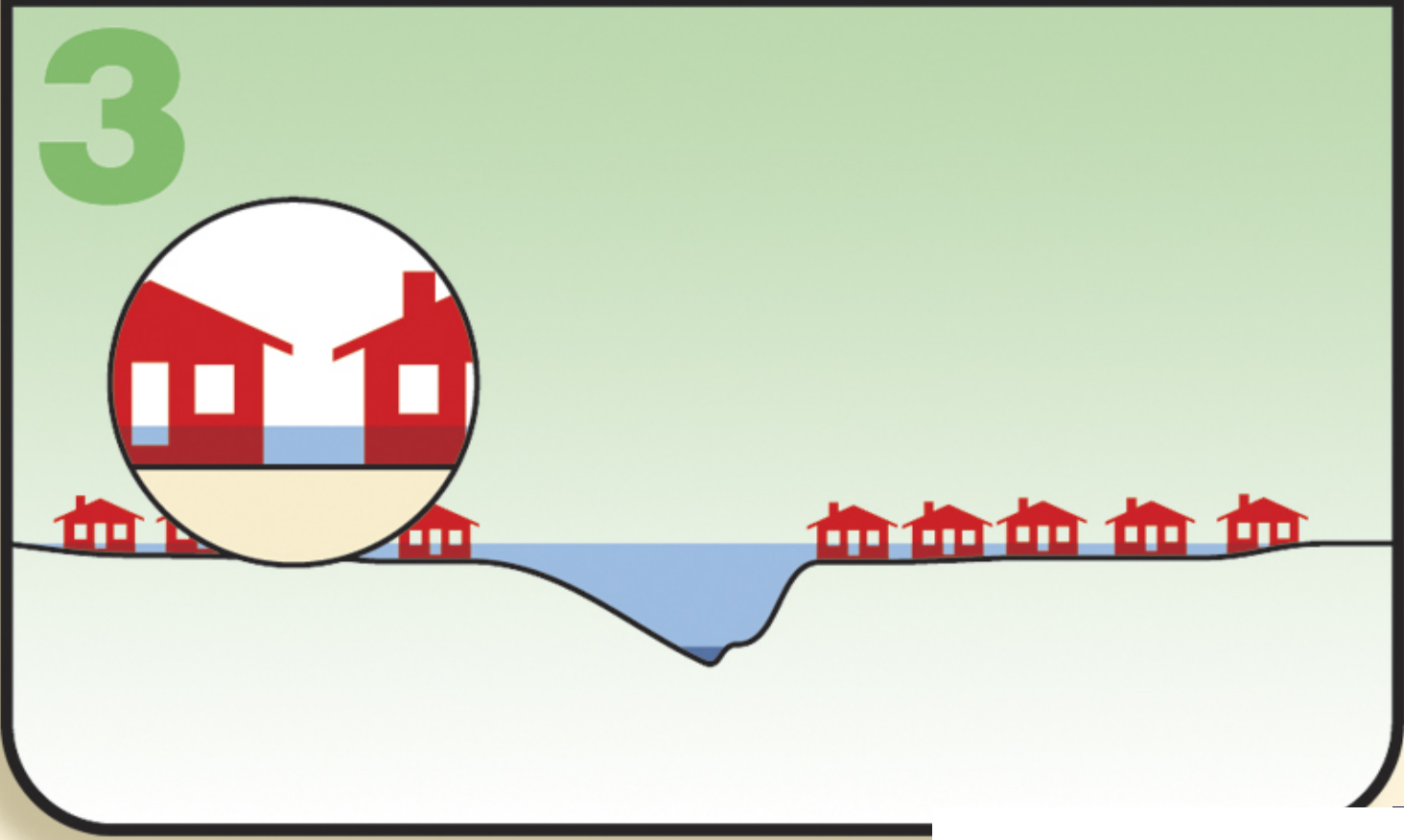
LNV ENGINEERING
engineers & consultants

VALLEY FLOODPLAIN



LNV ENGINEERING
engineers & consultants

SHALLOW FLOODPLAIN

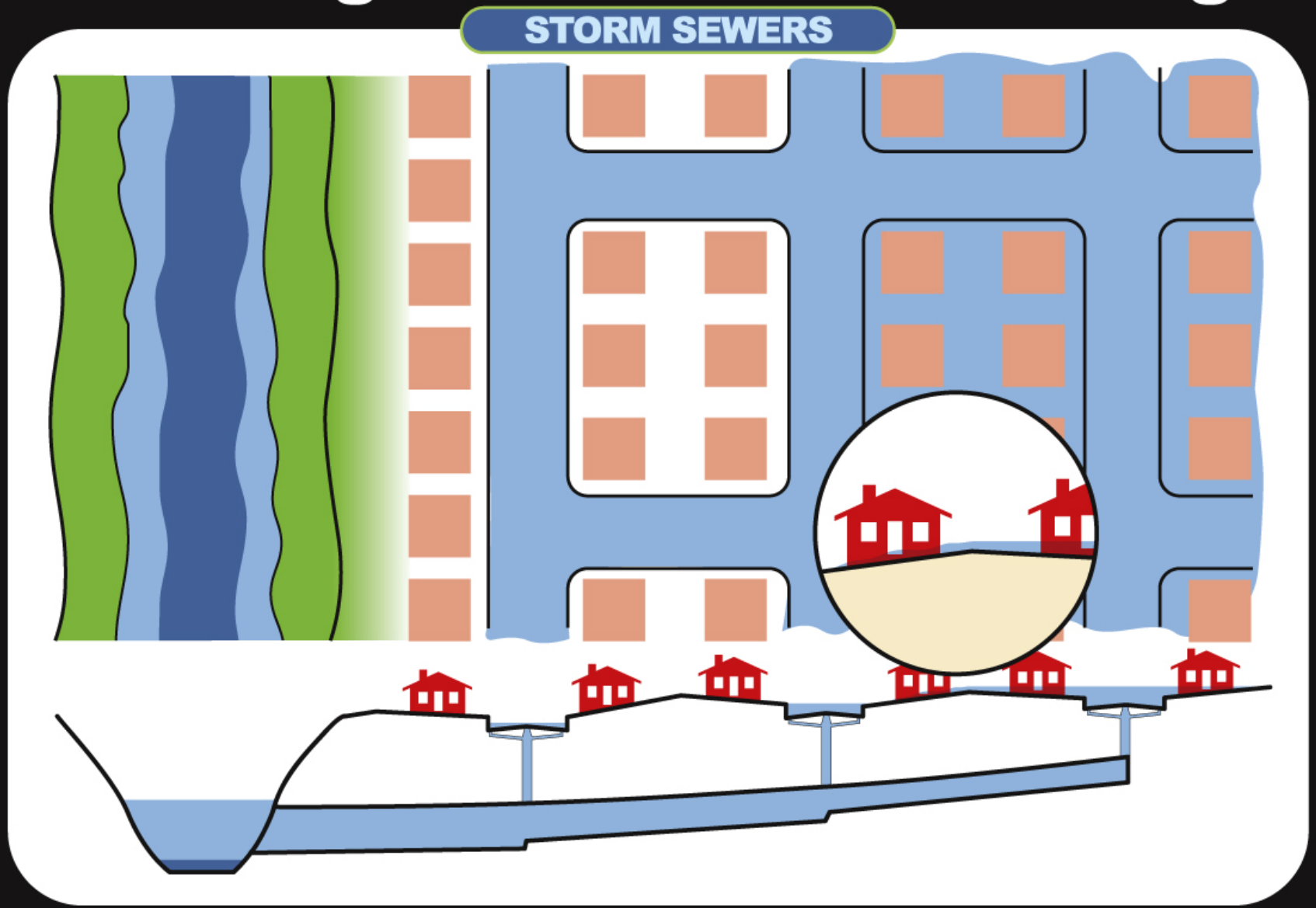


LNV ENGINEERING
engineers & consultants

Another Scenario

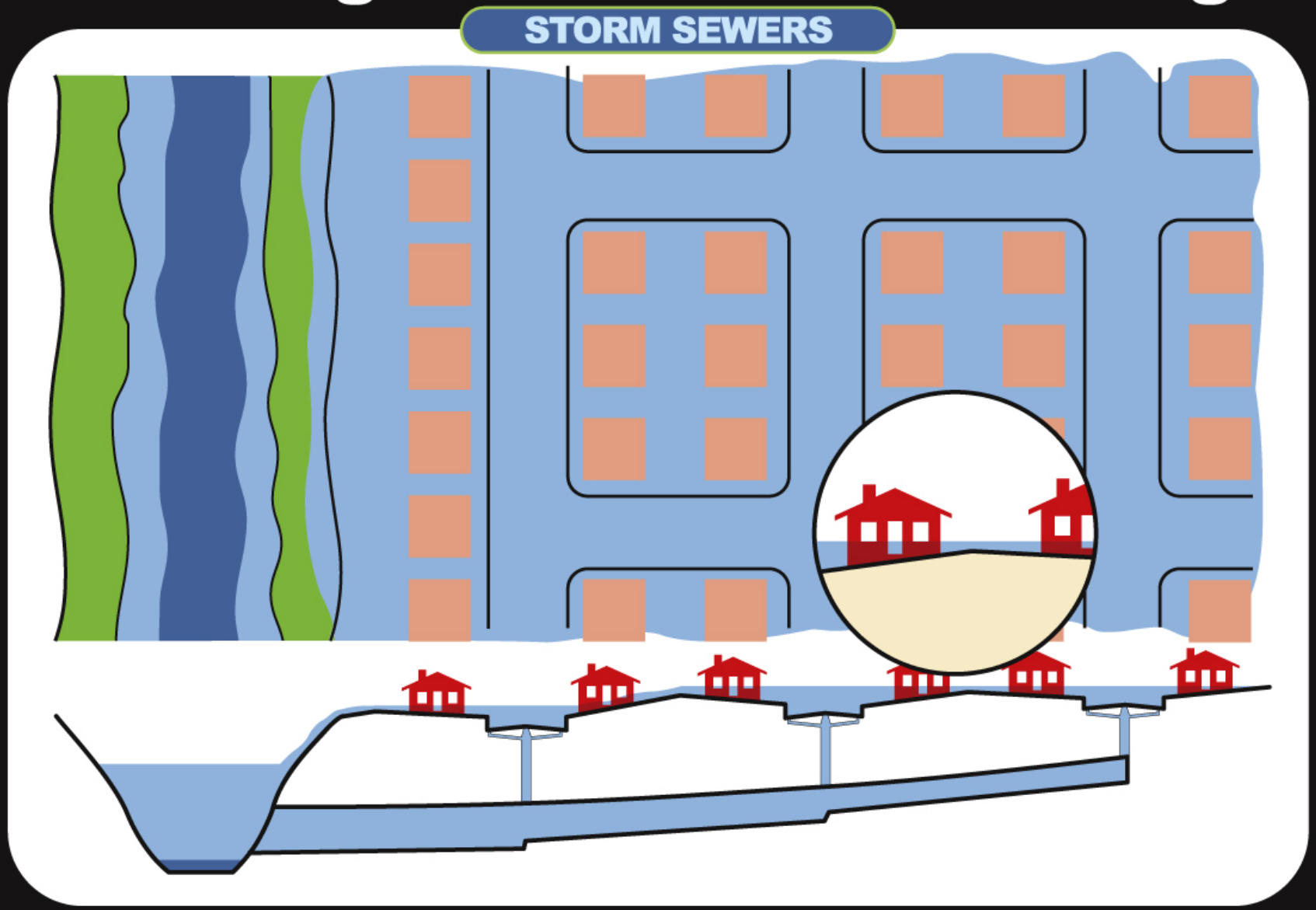
LNV ENGINEERING
engineers & consultants

Ponding & Sheet Flow Flooding



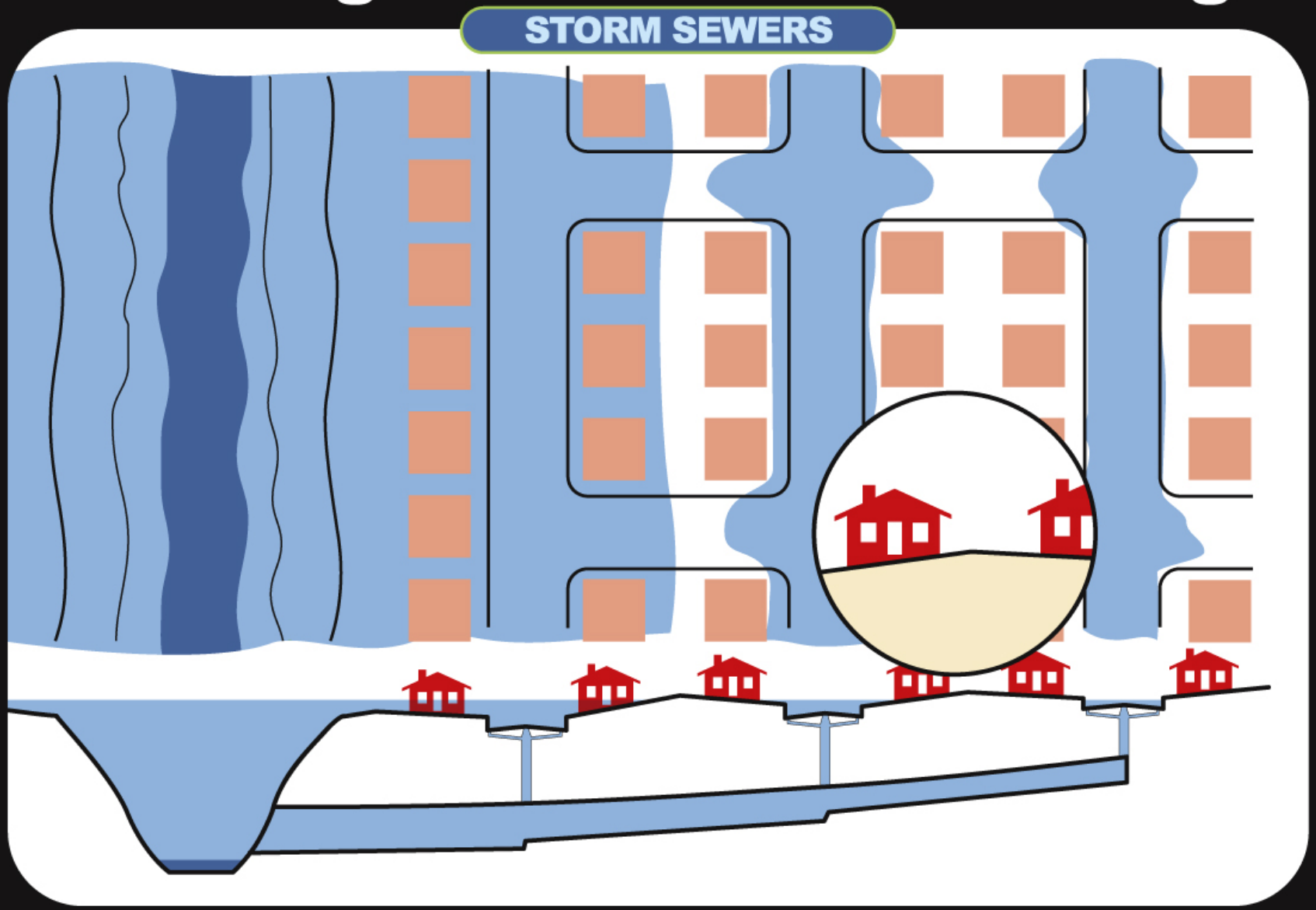
FLOODING FROM INTENSE LOCAL RAINFALL
(Short Duration)

Ponding & Sheet Flow Flooding



FLOODING FROM INTENSE LOCAL RAINFALL
(Longer Duration)

Ponding & Sheet Flow Flooding



FLOODING FROM INTENSE LOCAL RAINFALL
(Stream Flooding)

How Detention Works

LNV ENGINEERING
engineers & consultants

Detention

- Definition of detention
  - The use of engineering calculations to design a drainage system to reduce flows resulting from new development to pre-development or undeveloped conditions

LNV ENGINEERING
engineers & consultants

Detention

- In existing conditions, peak flow creates few impacts

- New development can create higher peak flows

LNV ENGINEERING
engineers & consultants

Bexar Regional Watershed Management

LNV ENGINEERING
engineers & consultants

Floodplain Management

LNV ENGINEERING
engineers & consultants

The Problem of Flooding

- 80,000 miles of rivers and streams in Texas
- 20,000,000 of total 171,000,000 acres are flood prone areas (12%)
  - More than any other state
  - 460 of total 3,500 acres are flood prone in Helotes (13%)
- Historically, watercourses have served as focal points for the establishment and growth of cities and towns
- Floods in Texas are by far the most common and serious natural hazard

LNV ENGINEERING
engineers & consultants

History of Flood Control

- Federal government and state attempted to curb escalating flood damages by constructing (structural approach):
  - Dams
  - Levees
  - Floodwalls
  - Enlarging or straightening stream channels

History of Flood Control (Cont.)

- Mid 1950s, realization that structural approach was not the ultimate solution
  - Expenditures for flood control works increased
  - So did annual flood damage
  - False sense of security
  - More extensive development of the "protected" areas
- Flood damage far exceeded the amount of damage that would have occurred if the floodplain areas had not been protected by structural means

History of Flood Control (Cont.)

- Something else had to be done!
  - Rather than trying to control flooding totally, attention turned to the cause of the problem
    - Undesirable floodplain development
- Out of this idea was born the concept of floodplain management

Floodplain Management

Full range of carefully planned public policy and action designed to promote the wise use of floodplains and to reduce future flood damages.

A comprehensive floodplain management program includes both corrective measures to rectify existing problems and preventive measures to keep new problems from developing.

LNV ENGINEERING
engineers & consultants

Floodplain Management

Local governments have the primary responsibility for establishing effective floodplain management programs. They have the authority to guide land use and development within their jurisdictions and are more familiar with their own flooding problems and what might be done about them.

LNV ENGINEERING
engineers & consultants

Floodplain Management

- Going the extra mile
  - Zoning regulations
    - Control the type, density and location of uses within or near the floodplain
  - Subdivision regulations
    - Used to ensure that known flood-prone areas are clearly described on subdivision plans for effective management and adequate notification to potential buyers
  - Building codes
    - Set forth flood proofing design and construction standards
- Each type of regulation achieves a slightly different objective, but all are important in reducing future flood damage

Floodplain Management

- Who is responsible?
  - Who enacts ordinances?
  - Who approves development permits?
  - Who reviews and acts on applications for permits to determine if they meet the requirements of the ordinance?
  - Who enforces the ordinance?
- Floodplains do not respect political boundaries!

Floodplain Management

National Flood Insurance Program

A mutual agreement between the Federal government and the community.

To allow flood insurance to be available to all citizens within the community, we promise to regulate development within identified floodplains.

Floodplain Management

HB 1018 of the 76th Texas Legislature states, “the governing bodies of each city and county shall adopt ordinances or orders...to be eligible to participate in the National Flood Insurance Program.”

There are 1,287 mapped communities in Texas and 1,100 communities participate in the NFIP

LNV ENGINEERING
engineers & consultants

Floodplain Management

- NFIP Goals
  - Reduce loss of life and property caused by flooding
  - Reduce rising disaster relief costs caused by flooding
  - Make federally backed flood insurance coverage available and affordable to property owners

Floodplain Management

- Accomplishing NFIP Goals
  - Require new construction and substantial improvements to be flood resistant
  - Guide future development away from flood hazard areas
  - Transfer flood loss costs from taxpayers to floodplain property owners
  - Prohibit new development that would increase flood heights

Floodplain Management

- Non-participation in NFIP
  - No flood insurance thru NFIP
  - No federal loans (VA, FHA)
  - No federal grants for buildings in flood zones
  - Limited federal disaster assistance
  - Local government may be liable for denying citizens the right to purchase flood insurance

Floodplain Management

Fact

During a typical 30-year mortgage, a building in a flood hazard area is 25 times more likely to be damaged by a flood than by a fire.

Structures built to meet or exceed the minimum NFIP standards suffer 77% less damage in a flood than those not built to these standards.

LNV ENGINEERING
engineers & consultants

Floodplain Management

- What your floodplain ordinance should include
  - All necessary federal and state floodplain management requirements (minimum FEMA standards or more restrictive)
  - Legally enforceable
  - Applies uniformly to all floodplain areas
  - Takes precedence over any less restrictive conflicting local ordinance or codes

Floodplain Management

- Floodplain Administrator
  - NFIP regulations, Section 59.22(b)(1) requires a community to designate an official with the responsibility, the authority, and the means to implement the adopted ordinance
  - Fair administration
    - Technically qualified
    - Thorough knowledge of the NFIP
  - Support of the local governing body

Floodplain Management

- Duties of the Floodplain Administrator (not all inclusive)
  - Floodplain development permit system
  - Reviewing development for compliance with ordinance and insuring no negative impact in the floodplain
  - Obtaining best available data from all sources to use in reviewing permits
  - Addressing violations
  - Keeping records
  - Biennial Report to FEMA
  - Maintaining flow-carrying capacity for watercourse alterations

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Steps in the planning process
    - Step 1 – Define the problem
    - Step 2 – Establish local objectives
    - Step 3 – Determine what tools are available
    - Step 4 – Selecting alternatives
    - Step 5 – Implementing the plan

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Step 1 – Define the problem
    - Evaluating economic and social impacts – costs and benefits of existing or proposed land uses
    - Evaluating environmental and water quality issues
      - Floodplain benefits
        - Natural retention and storage area
        - Maintenance of water quality by serving as a place where floodwaters deposit sediment, debris, or chemical impurities

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Step 2 – Establishing local objectives
    - How much flood control is enough?
    - Involve the public
      - Strong public participation program
      - Encourage and facilitate input from all sectors of the community

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Step 3 – Determining what tools are available
    - Structural measures
      - Dams and reservoirs
      - Levees and floodwalls
      - Channel improvements
      - Watershed treatment
    - Nonstructural measures
      - Floodplain regulation
      - Zoning
      - Building codes and subdivision regulations
      - Storm water management

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Step 4 – Selecting alternatives
    - Matching solutions to problems
      - Feasible
      - Economic
      - Acceptable
    - Developing strategies
      - Short-term
      - Long-term
    - Sources of assistance

Floodplain Management

- Duties of Elected Officials – Planning to reduce flood damages
  - Step 5 – Implementing the plan
    - Regulatory and policy measures
    - Flood warning and preparedness
    - Capital improvements
    - Private development

Floodplain Management

Full range of carefully planned public policy and action designed to promote the wise use of floodplains and to reduce future flood damages.

A comprehensive floodplain management program includes both corrective measures to rectify existing problems and preventive measures to keep new problems from developing.

LNV ENGINEERING
engineers & consultants

Questions?

LNV ENGINEERING
engineers & consultants

Identification and Categorizing Storm Water Issues

Regional

Vs

Local Drainage

LNV ENGINEERING
engineers & consultants

Next Steps

LNV ENGINEERING
engineers & consultants